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inter-office memo

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FROM: Keith Ball, Brian Johnston 4/23/80

SUBJECT: Diagnostic Cartridge Evaluation

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4/21/80

DIAGNOSTIC CARTRIDGE

I. What is available on cartridge now.

A. 5 portions of the program are the test of the hardware systems of the Colleen and Candy

1. Power-up: always does intial tests. No user control
2. Video:
3. Tone: All these four are invoked by user command
4. RAM:
5. Ports:

B. Power-up

1. This is always done whenever power is turned on or system reset button is pressed
2. It tests the portions of RAM (pages 0,1) that the test program cartridge uses for variable storage and the ROM cartridge (left only)

C. Video

1. Done when user types in one of the 3 video commands
   a. 'A' - ANYVIDEO
   b. 'C' - COLORBARS
   c. 'G' - GRAYBARS
2. ANYVIDEO is a test for any video capabilities of the system.
   a. displays 4 players, 4 missles, a foreground, all on a black background.
   b. has 2 V's displayed to test Anitc chip.
      1. if inverted Antic damaged.
3. COLORBARS displays the 16 different colors the system can produce plus a reference color to measure the degree of color adjustment needed.
   a. tests CTIA and color network
   b. a rainbow of colors is displayed between 2 gray bars. The lower bar is used as a reference line for color adjustment. The color bars below and above the line should match.
   c. if colors are off the adjustment pot on the machine is used to rectify
      1. home user should not touch the adjustment pot.

C. Video, cont.

4. GRAYBARS display the gray gradations of the system in order to test the luminescence.
5. There is NO prompt telling user how to return to command entry mode.

D. Tone

1. Invoked when user types in "T' for tone test.
2. Test the tone registers for tone and volume.
3. The user can test only one of the 4 tone registers at a time. User enters a number from 1 to 4 to specify which one.
4. 8 tones are emitted and each starts at low volume and goes to high volume.

E. Before RAM or PORT tests are run the Display OPTIONS function should be gone through.

1. Invoked by typing in D.
2. This function allows user to specify the detail of the error report and the test length.
3. Detail errors are reported by manual documented list maps. (General error reports are in PASS/FAIL form.
4. Test length is defined as simple, which performs one test then returns to command prompt, and continuous, which performs the test until user "breaks" the program.
   a. doesn't use break key.
5. User is prompted for options.
   a. excepts invalid data and gives default options (PASS/FAIL - single test) without informing user of error.
6. After options picked program displays the decided (2) options.

F. RAM

1. Invoked only when user types R. User is then prompted for the number of 8K blocks (1-4) that should be tested.
2. If PASS/FAIL option picked the response is RAM TEST - with PASS or FAIL written next to it.

F. RAM, cont.

3. If detail errors picked bit map appears it is 5 rows with 7 columns being all zeros for no errors. Error map is described in documentation. It tells address of failure, actual data, and expected data.
4. The test is comprised of 6 internal tests on the RAM specified. It stops testing when the first failure is detected or all the tests are completed.
5. RAM test takes up to 20 seconds. During this time, for the initial test, the screen is blank except for the scroll area.
6. User is not told how to get out of continuous test. Press any key but should press return or space.

G. PORTs test

1. Invoked only when user types in P. If single test message to plug in jumper card appears, however doesn't appear for continuous test.
2. For PASS/FAIL displays PORT test check followed by PASS or FAIL. Detailed erro map is a matrix of 1's and 0's, defined by rows labeled A thru H and column 7 to 0. 1's for error and 0's for O.K. Detailed errors are explained in documentation.
3. The test checks all the player ports (pot, trigger, stick), the serial I/O ports A and B, the PIA chip.
4. Test stops after all the checks are made for failure or pass.
5. Does not tell user how to get out of continuous test. Must press one of console switches (START, SELECT, or OPTION).

II. Documentaion now available.

A. Documentation consists of the Tech manual written for the sophisticated user (field service tech); this is made for internal useage and not for the home-user/consumer.

B. All sections must be rewritten to explain:

1. Why and when user should use cartridge.
2. How to set-up cartridge to run step by step.
3. Which adjustments a user can make and which he cannot.
4. For power-up - what happens when fails/what to do about it.
5. For video
   a. what errors caused by TV and which by computer.
   b. tell user not to adjust color and how much color being off is O.K.
   c. how to return to command entry mode from video test displays.
6. For RAM
   a. how to get out of continuous test.
   b. what PASS/FAIL diagnostics mean.
7. For Display Options
   a. what are default options and how to get them.
   b. accepts invalid input with no error message.
8. For Tone test
   a. what test results mean in terms of problems with the machine.
9. For Port test
   a. how to install port jumper card and plug.

C. Describes in detail bit maps for errors. Some of this should be excluded.

D. Division into Theory, Procedure and Results for each test.

III. Software to add.

A. Tests already written by Rich Gragg.

1. Keyboard test.
2. Console switch test.
3. 3 more RAM tests.
4. Check sum test of the OS RAM.

B. Tests partially written.

1. Test of interrupts from PIA and POKEY.
   a. needs human interface.
2. Test of right cartridge.
   a. function is written but needs to be re-thought to make compatable with OS.

C. Test suggestions.

1. Linearity, width and height tests.
   a. use cross hatch.
   b. user should not adjust TV but gives them info on problems and if problem (character loss, etc.) is objectionable to user then can get it serviced.
2. Change Tone test.
   a. have each register sequentially play each tone as the test goes through all 8 different tones.
      -i.e. tone #1 is played by reg 1 to 4 sequentially then tone #2 is palyed by all 4 sequentially and so forth.

D. Add a MENU of commands and TESTS when requesting a command entry.

E. Changes to Program.

1. Make error messages in English for display options invalid input. Have user retry and do not give default.
2. Roll screen further to give clean display/prompt. Only have current information showing.
3. Put something on screen when RAM test initiates. Don't leave screen blank.
   a. e.g. RAM TEST IN PROGRESS

E. Changes to Program, cont.

4. Make diagnostic messages more English.

    a. extend PASS/FAIL response for user.
    b. for RAM say which 8K/16K cartridge failed.
    c. for Port test name item that failed.
        1. PIA
        2. Player Ports
        3. Serial I/O Ports
    d. leave bit maps (with documentation) for more sophisticated user.

5. Sync software to video to remove fracture/glych.
    a. 1 or 2 instructions(?).

IV. Must have Jumper Card and Plug available for use.

A. These can be packaged.

B. Need documentation on how to install it.

V. Color adjustment.

A. User should not adjust color because it is to easy for user to break something.

B. For COLOR BAR Test.

1. If color bar below gray reference line is the same as the color bars 1 or 2 above gray reference line than the color will be O.K.. It will exhibit only a slight variation from normal.
   a. 1 bar is a very slight adjustment.
   b. it doesn't need any adjustment.

C. If color bar is more than 2 bars in difference, color may vary highly. If objectionable to user, he should take the console to be adjusted by a service person.